

The Responsible Conduct of Animal Research

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Students in graduate education in the basic sciences have a high probability of using live animals at some point in their research training. Although animal rights are a volatile issue for public debate, the use of animals in graduate science education raises little controversy among research trainees. Due to a National Institutes of Health (NIH) mandate, most graduate science programs today offer instruction in the responsible conduct of research that may include the ethics of experimentation with animal subjects¹. Similarly, federal requirements for animal research review committees include provisions for the technical training of students and others conducting procedures with live animals².

As part of their responsibilities for overseeing the housing and care of research animals and the safe conduct of research, the veterinary staff of the University of Texas-Health Science Center at Houston offers formal training sessions in the safe and humane handling of laboratory animals and proper techniques for a variety of procedures. These sessions are offered regularly and are often filled well in advance.

The University's Institutional Animal Care and Use Committee (IACUC) and the veterinarians of the Center for Laboratory Animal Medicine and Care (CLAMC) are justly proud of their record of concern for animal welfare and the institution's humane research practices. Nonetheless, faculty involved in the required research ethics course at the University of Texas-Graduate School of Biomedical Sciences at Houston routinely hear comments from first- and second-year students who feel uncomfortable in their animal work, particularly in mastering routine procedures after the formal training has ended. Often these comments, made in small group discussions, are about the value of biomedical research with animals and questions about animal suffering. The same students typically express unwillingness to ask for help or further instruction for fear of criticism from their faculty and/or older peers. Nonetheless, many agree that more direct training in the handling and use of specific research animals would improve their skills, confidence, and attitude toward the work, as well as improve the quality of their research.

Research in medical education has demonstrated that trainees who ignore or discount their emotional responses to patients and the pain that medical procedures may cause are at risk of becoming emotionally stifled, cynical, and even punitive in response to the suffering of others. In contrast, by including formal attention to the emotional dimensions of patient care, medical educators have been shown to foster trainees' compassion and personal satisfaction in their work³. Moreover, by learning to identify and address their emotional responses directly, medical trainees have been

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found to improve the accuracy of their diagnosis and treatment. Parallel risks and opportunities exist for researchers who use animals, and efforts to address the emotional dimension of animal use make a valuable addition to the institution's efforts to enhance the integrity of scientific research.

In response to the perceived need for more focused education and hands-on training for graduate students in the biomedical sciences, the authors organized a new intensive course entitled "*The Humane Use of Animals in Biomedical Research*." The course offers a highly structured and multidisciplinary approach to responsible animal research. Its goal is to provide instruction in the ethics and regulatory aspects of animal research, approaches to the reduction of the numbers of animals used in specific protocols, including alternative research methods, and extensive practical training tailored to the individual animal model that each participant expects to use. Using a combination of didactic sessions, case discussions, and direct, hands-on laboratory instruction under the close supervision of institutional veterinarians, the course faculty seek to enhance students' theoretical knowledge base, technical skills, practical compassion, and professional confidence.

An aspect unique to this course is the inclusion of structured group discussion intended to help students address their personal experiences, concerns, values, and attitudes regarding their interaction with animals and the demands of animal research. Faculty facilitators help students recognize and prepare for the personal and ethical challenges of live animal experimentation using a modified version of the Balint method, which has been used in medical education to promote personal awareness and effective, compassionate patient care⁴.

The course was offered to graduate students, post-doctoral fellows, research associates and technicians across the University for the first time in July 2000. The course schedule, including topics, instructors, and format appears in Table 1. The list of assigned readings for the course appears in the Appendix.

Evaluation (Students', Instructors', Course Coordinators')

As part of the wrap-up on the last day of class, students were encouraged to provide a comprehensive evaluation of the course, with

particular attention to the aspects of reading assignments, class structure and timing, and the integration of theoretical material and practical skills. One week following the end of the course, the instructors and course-coordinators held a similar debriefing and evaluation session with a special focus on potential changes for subsequent course offerings. The following constructive suggestions were made by course attendees:

Positive points

1. The readings were comprehensive and challenging.
2. The practical aspects and methodologic training were invaluable even to students not working in laboratories.
3. Learning about regulations and IACUC activities from IACUC members was very enlightening about the practicalities of researchers' obligations and institutional review.
4. The information on alternative methods to animal research was important to new researchers considering a variety of techniques.
5. The presence, knowledge, and guidance of veterinarians were a tremendous intellectual and practical asset.
6. The variety of viewpoints presented by interdisciplinary faculty and guest lectures was useful in understanding the scope of animal research and its ethical gray areas.
7. Discussion of the personal demands of research was valuable for integrating interdisciplinary issues and helpful for students seeking to come to terms with the demands of their work.
8. The intensive class format enhanced rapport among students and faculty.

Drawbacks and obstacles

1. The time commitment in an intensive 2-week format was extremely hard for students to manage along with their regular daily schedules.
2. The summer offering made scheduling faculty assignments difficult because of their travel schedules and other special commitments.
3. The logistical complexity of organizing multiple faculty in both classroom and laboratory was very time consuming for the course organizers.
4. More practical discussion of alternative methodologies by practicing researchers was needed.
5. Students in science are often uncomfortable with ethical ambiguity and like

clear answers.

6. Faculty need to focus more on the links between ethical debate, science policy, and practical demands of research.

7. The costs of laboratory materials for a larger enrollment are likely to be considerable

8. Students' perception of the need for such

a course is variable. Faculty need to identify and address the multiple goals of different students in different backgrounds throughout the class.

Conclusion

Evaluation by the student and faculty participants and a critique of the course by the course

DATE	CLASS	Topic	INSTRUCTOR
Monday 07/17	Lecture	<ul style="list-style-type: none"> • Historical uses of animals in biomedical research • Ethical and regulatory perspectives on animals in biomedical research 	Heitman Anestidou
Tuesday 07/18	Lecture	<ul style="list-style-type: none"> • Scientific approaches to refining animal research (the three Rs) • Balint group discussion 	Heitman Anestidou
Wednesday 07/19	Lecture	<ul style="list-style-type: none"> • IACUC: its function and responsibilities • How to fill out animal protocol forms 	Smith Heitman Anestidou
Thursday 07/20	Lecture	<ul style="list-style-type: none"> • Alternatives to animal models 	Heitman Anestidou Bjerckey
Friday 07/21	Lecture	<ul style="list-style-type: none"> • AAALAC and the Guide • Housing and standards of care for laboratory animals- Facility tour • Balint group discussion 	Goodwin Blasdel Heitman Anestidou
Monday 07/24	Lecture Lab	<ul style="list-style-type: none"> • Mouse biology, care, and management 	Head
Tuesday 07/25	Lecture Lab	<ul style="list-style-type: none"> • General anesthesia and pain control; rodent-specific protocols; • Anesthesia matters (video) • Rodent anesthesia practicum 	Smith
Wednesday 07/26	Lecture Lab	<ul style="list-style-type: none"> • Monkey retirement facility speaker • Balint group discussion 	Griffin Heitman Anestidou
Thursday 07/27	Lab	<ul style="list-style-type: none"> • Disposition of animals after research • Euthanasia 	Blasdel Head
Friday 07/28	Lecture Discussion	<ul style="list-style-type: none"> • Wrap up course material • Evaluation 	Heitman Anestidou

Table 1. *The Human Use of Animals in Biomedical Research-Course Outline and Schedule*

coordinators resulted in significant enthusiasm to repeat it. The course will be offered again in the summer 2001 term, using mostly the same didactic methods and material, but in a less intensive format. The course coordinators, CLAMC veterinarians, IACUC members, and the University's administration hope that in the next few years the course will be developed into both an integrated part of many students' education at the Graduate School and a continuing education course available to researchers and others from outside our institution.

2. National Institutes of Health, Alcohol, Drug Abuse, and Mental Health Administration. Reminder and update: requirement for programs on the responsible conduct of research in National Research Service Award institutional training programs. *NIH Guide* 1990; 19 (30): 1.
3. Gorlin R, Zucker, HD. Physicians' reactions to patients: a key to teaching humanistic medicine. *New England Journal of Medicine* 1983; 308: 1059-63.
4. Novack DH, Suchman AL, Clark, W Epstein RM, Najberg E, Kaplan C. Calibrating the physician. Personal awareness and effective patient care. *JAMA* 1997; 278: 502-09.

Bibliography

1. U.S. Department of Health and Human Services. *Guide for the care and use of laboratory animals (revised)*. NIH Publication #86-23. Washington, DC: DHHS, 1985.

Appendix.

The Human Use of Animals in Biomedical Research-Course Readings

(by topic)

History of animals in biomedical research; ethical & regulatory perspectives on animals in biomedical research

- F. Barbara Orlans, "The Beginnings of Institutionalized Animal Experimentation" and "Current Attitudes and Ethical Arguments" in *In the Name of Science: Issues in Responsible Animal Experimentation*, New York: Oxford University Press, 1993: 3-34.
- Caplan, Arthur, "Beastly Conduct: Ethical Issues in Animal Experimentation", *Science*, 1983, 406: 159-169
- Brody, Baruch "The Use of Animals in Research" in *The Ethics of Biomedical Research: An International Perspective*, New York: Oxford University Press, 1998: 11-30.
- National Association for Biomedical Research, "The Strict Regulations that Govern Research" *Animal Research Facts*, <http://www.fbresearch.org/research98.htm>

Procurement of animals for research and education; Scientific approaches to refining animal research (the three Rs)

- F. Barbara Orlans, "The Source of Laboratory dogs and Cats: Pound versus Purpose-Bred Animals", in *In the Name of Science: Issues in Responsible Animal Experimentation*, New York: Oxford University Press, 1993, 209-220.
- "Shelter Intake and Euthanasia Trends", *Animal Policy Report* 2000, 14 (2): 2.
- Judith Reitman, "From the Leash to the Laboratory", *Atlantic Monthly* 2000, 286(1): 17-21.
- "Pet Theft: Urban Myth Makes Useful Propaganda", *FBR Facts* (Foundation for Biomedical Research), 2000, 7(2), 2 pages. <http://www.fbresearch.org>
- Joanna Weiss, "Squid's Fate: Science of Seafood", *Houston Chronicle (from Boston Globe)*, June 27, 2000, 3D.
- W.M.S. Russell & R.L. Burch, "Introduction" in *The Principles of Humane Experimental Technique*. London: Methuen & Co., 1959, 3-13.
- Alan M. Goldberg, Joanne Zurlow, & Deborah Rudacille, "The Three Rs and Biomedical Research" (editorial), *Science*, 1996, 272: 1403.
- Ruth Ellen Bulger, "Use of Animals in Experimental Research: A Scientist's Perspective", *Anatomical Record*, 1987, 219: 215-220.
- National Association for Biomedical Research, "Animals in Research 1998", *Animal Research Facts*, <http://www.fbresearch.org/research98.htm>
- Michael F.W. Festing, et al., "Reducing the Use of Laboratory Animals in Biomedical Research: Problems and Possible Solutions" — The Report and Recommendations of ECVAM Workshop 29, *ATLA* 1998, 26: 283-301.

The function and responsibilities of the IACUC

- Robert A. Whitney, Jr., “Animal Care and Use Committees: History and Current National Policies in the United States”, *Laboratory Animal Science* 1987, Special Issue, 18-21.
- Henry J. Baker, “Essential Functions of Animal Care and Use Committees”, *Laboratory Animal Science* 1987, Special Issue, 30-33.
- “Consensus Recommendations on Effective Institutional Animal Care and Use Committees” *Laboratory Animal Science* 1987, Special Issue, 11-13
- F. Barbara Orlans, “What Does the Public Have a Right to Know?”, in *The Human Use of Animals Biomedical Research*. New York: Oxford University Press: 103-117.
- UT -Houston Health Science Center, Animal Welfare Committee, “Animal Protocol Review Form”, revised 11/1/96.

Alternatives to animal models

- Michael Ballis, “Why is it Proving to be So Difficult to Replace Animal Tests?” *Lab Animal* 1998, 27 (5): 44-47.
- Richard N. Hill & William S. Stokes, “Validation and Regulatory Acceptance of Alternatives”, *Cambridge Quarterly of Healthcare Ethics* 1999, 8, 73-79.
- Jacques LeClaire & Odile De Silva, “Industry Experience with Alternative Methods”, *Toxicology Letters* 1998, 102-103: 575-579.
- Seymour Levine & Arthur Saltzman, “An Alternative to Overnight Withholding of Food from Rats”, *Contemporary Topics (American Assn. for Laboratory Animal Science)* 1998, 37: 59-60.
- Sharron Kirchain & Robert P. Marini, “A Tissue Harvesting Program as a Method for Implementing the 3Rs of Biomedical Research”, *Lab Animal* 1998, 27 (8): 37-39.
- Adrian Smith, Richard Fosse, David Dewhurst, & Karina Smith, “Educational Simulation Models in the Biomedical Sciences”, *ILAR Journal* 1997, 38 (2), 82-88.

Standards of care and housing for laboratory animals

- National Research Council, Institute of Laboratory Animal Resources, *Guide for the Care and Use of Laboratory Animals*, Washington, DC: National Academy Press, 1996.

Anesthesia and pain control

- Lawrence R. Soma, “Assessment of Animal Pain in Experimental Animals”, *Laboratory Animal Science* 1987, Special Issue, 71-74.
- American College of Veterinary Anesthesiologists, “Position Paper on the Treatment of Pain in Animals”, *JAVMA* 1998, 213(5), 628-630.
- American Association for Laboratory Animal Science, “Position Statement: Recognition and Alleviation of Pain and Distress in Laboratory Animals”, <http://aalas.org>
- American Association for Laboratory Animal Science, “Policy #12 — Consideration of Alternatives to Painful/Distressful Procedures — June 21, 2000. <http://aalas.org>

Disposition of animals after research

- American Veterinary Medical Association Panel on Euthanasia, “1993 Report of the AVMA Panel on Euthanasia”, *JAVMA* 1993, 202: 229-249.
- UT -Houston Health Science Center, Center for Laboratory Animal Medicine and Care”, “Animal Adoption Release form”, revised 11/1/96.

Wrap up and evaluation

- Diane J. Gaertner, Lele K. Riley, & Dale G. Martin, “Reflections on Future Needs in Research with Animals”, *ILAR Journal* 1998, 39: 306-310.

